

On Rapid Changes in the History of Species.—MR. THOMAS MEEHAN exhibited flowers of the remarkable *Halesia* noted at page 32, and remarked on the wide divergence reached without any intervening modifications from the original, and observed that it was another illustration of what he thought must now be generally accepted, that the maxim of Ray "*Natura non facit saltum*" itself needed modification. He had called attention to this particular departure, among others, in a paper before the *American Association for the Advancement of Science*, in 1874;¹ what he desired to do now was to emphasize a few of the points brought out prominently in that paper, that "Variations in species, as in morphological changes in individuals, are by no means by gradual modifications; that suddenly formed and marked variations perpetuate themselves from seeds, and behave in all respects as acknowledged species; and that variations of similar characters would appear at times in widely separated localities."

In addition to the illustrations given in that paper, a remarkable one was afforded by the *Richardia æthiopica*, the common "calla" of gardens, the present season. Some four inches below the perfect flower a mere spathe was developed, partially green, but mostly white, as usual, but in this case we do not call it a spathe, but a huge bract. In other words, the usually naked flower-scape of the *Richardia* had borne a bract. Flowers with a pair of more or less imperfect spathes were not uncommon in some seasons; the peculiarity of the present season was the interval of several inches on the stem, which justified the term of bract to the lower spathe. From the vicinity of Philadelphia numbers had been brought to him, and others had been sent from Ohio, Indiana and Illinois—some hundreds of miles apart. What was the peculiarity in this season over others which induced the production of this bract, was one question. Whatever it may have been, it operated in bringing about a change of character, without the intervention of seed, directly on the plant, and in many widely separated places at the same time. What is to prevent a law which operates exceptionally in one season, operating again and in a regular and continuous way? So far as we can understand there can be no reason; and, if it should, we have a new species, not springing from a seed, or one individual plant—constituting one geographical centre of creation from which all subsequent descendants emigrated and spread themselves—but a whole brood of new individuals already widely distributed over the earth's surface, and entirely freed from the "struggle for existence" which the development of a species from a solitary individual presupposes.

Aside from the great value of this illustration of how the whole character of a species might be modified simultaneously

¹ See Proc. Amer. Assoc. Ad. Science, vol. xxiii, p. B. 9.

over a wide extent of country, it afforded a lesson in environment. External circumstances may influence modification, but only in a line already prepared for modification. This must necessarily be so, or change would be but blind accident, whereas palæontology teaches us that change has always been in regular lines, and in co-ordinate directions which no accident has been able to permanently turn aside. Just as in the birth of animals, we find, that however powerful may be some external law of nutrition, which, acting on the primary cell of the individual decides the sex, yet we see that no accident has been able to disturb the proportion of the sexes born, which has always been, so far as we know, nearly equal. So in the birth of species, making all allowance for the operation of environment, the primary plan has been in no serious way disturbed; we have to grant something to environment in the production of new forms, but only as it may aid an innate power of change, ready to expend itself on action as soon as the circumstances favor such development—circumstances which after all have very little ability to determine what direction such change shall take.

We know that distinct forms do spring through single individuals from seed, and that, after battling successfully with all the vicissitudes of its surroundings, a new form may succeed in spreading, through the lapse of years or ages, over a considerable district of country. But the idea that always and in all cases species have originated in this manner, presents, occasionally, difficulties which seem insurmountable. In the case of the similarity between the flora of Japan and that of the eastern portion of the United States, we have to assume the existence of a much closer connection between the land over what is now the Pacific Ocean, in comparatively modern times, in order to get a satisfactory idea of the departure of the species from one central spot; and to demand a great number of years for some plants to travel from one central birthplace before the land subsided, carrying back species in geological time further, perhaps, than mere geological facts would be willing to allow. But if we can see our way to a belief that plants may change in a wide district of country simultaneously in one direction, and that these changes once introduced, be able to perpetuate themselves till a new birth-time should arrive, we have a great advancement towards simplifying things.

MAY 27.

Mr. J. H. REDFIELD in the chair.

Twenty-three persons present.

Mr. Henry N. Rittenhouse was elected a member.

The following were ordered to be printed:—